

IT IS CLAIMED:

1. A method of identifying genetically modified mammalian cells comprising the steps of:

5 a) introducing a nucleic acid sequence encoding a mutated muscle specific tyrosine kinase receptor (mMuSK-R) operatively linked to a promoter into a mammalian cell to form a genetically modified cell;

b) allowing expression of the mMuSK-R in the genetically modified cell; and

c) identifying the cells expressing the mMuSK-R.

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2. The method according to claim 1 wherein the mMuSK-R is a mutated sequence of the sequence encoded by the nucleic acid molecule set forth in SEQ ID NO. 1.

15 3. The method according to claim 1, wherein the mMuSK-R is a sequence having at least 150 amino acids deleted from the intracellular domain of a MuSK-R.

4. The method according to claim 1, wherein the mMuSK-R is a MuSK-R sequence having the kinase catalytic site deleted.

20 5. The method according to claim 2, wherein the mMuSK-R is mMuSK-RI or mMuSK-RII.

6. The method according to claim 1, wherein the identifying step is accomplished by contacting the genetically modified cells with an antibody.

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7. The method according to claim 1, wherein the nucleic acid sequence encoding the mMuSK-R is introduced into the mammalian cell by a vector.

8. The method according to claim 6, wherein the vector is a retroviral vector.

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9. The method according to claim 1, wherein the mammalian cells are hematopoietic cells.

10. The method according to claim 1, wherein the nucleic acid encoding the mMuSK-R is introduced in combination with a second nucleic acid encoding sequence wherein the second sequence encodes a protein of interest.

11. The method according to claim 1, further comprising the step of separating the identified cells expressing the mMuSK-R.

10 12. The method according to claim 1, wherein the identifying step separates the genetically modified cells from the non-modified cells.

15 13. A vector comprising a nucleic acid sequence encoding a mutated muscle specific tyrosine kinase receptor (mMuSK) operatively linked to a promoter wherein the mMuSK-R is derived from the sequence set forth in SEQ ID NO. 1 or a sequence substantially identical to the sequence set forth in SEQ ID NO:1.

20 14. A method of identifying genetically modified human hematopoietic cells comprising the steps of:

- 25 a) introducing a nucleic acid sequence encoding a muscle specific tyrosine kinase receptor (MuSK-R) into a human hematopoietic cell;
- b) allowing expression of the MuSK-R in said cells; and
- c) identifying the genetically modified hematopoietic cells from the non-modified hematopoietic cells.

15. A method of identifying genetically modified human hematopoietic cells comprising the steps of:

- 5 a) incorporating a nucleic acid sequence encoding a mutated muscle specific tyrosine kinase receptor (mMuSK-R) into a population of human hematopoietic cells;
- b) introducing a heterologous DNA sequence which encodes a protein of interest into the population of human hematopoietic cells;
- 10 c) allowing expression of the mMuSK-R in said cells; and
- d) identifying the genetically modified cells expressing the mMuSK-R.

16. The method according to claim 14, wherein both the heterologous DNA sequence encoding the protein of interest and the nucleic acid sequence encoding the mMuSK-R are introduced into the cells on the same vector.

15 17. A method for the immunoselection of transduced mammalian cells comprising the steps of:

- 20 a) transducing cells with a nucleic acid sequence encoding a mutated muscle specific tyrosine kinase receptor (mMuSK-R);
- b) incubating the cells with an antibody which recognizes and binds specifically to the mMuSK-R; and
- c) identifying the bound transduced cells.

18. The method according to claim 16, wherein the cells are transduced by a retroviral 25 vector derived from the group consisting of moloney murine leukemia virus (MoMLV), myeloproliferative sarcoma virus (MPSV), murine embryonic stem cell virus (MESV), murine stem cell virus (MSCV) and spleen focus forming virus (SFFV).

19. The method according to claim 16, further comprising separating the identified 30 bound transduced cells from non-bound cells.

20. The method according to claim 16, further comprising expanding the bound transduced cells.

21. A method of identifying mammalian cells expressing a protein of interest,

5 comprising

- a) introducing into a population of mammalian cells a nucleic acid sequence encoding a mutated muscle specific tyrosine kinase molecule (mMuSK-R), wherein said mMuSK-R can not effect signal transduction;
- b) introducing a nucleic acid sequence comprising a DNA sequence encoding a protein of interest into said population;
- c) culturing the mammalian cells under conditions which favor growth and expansion of said cells; and
- d) identifying cells which express mMuSK-R thereby obtaining cells which express the protein of interest.

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22. An antibody which binds specifically to the epitope recognized by the antibody H1 produced by the hybridoma deposited with the ATCC under accession number PTA-1548.

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23. A method of identifying mammalian cells comprising the steps of:

- a) introducing a nucleic acid sequence encoding a mutated muscle specific tyrosine kinase receptor (mMuSK-R) operatively linked to a promoter into a mammalian cell to form a genetically modified cell;
- b) allowing expression of the mMuSK-R;
- c) exposing the cells to a monoclonal antibody wherein said antibody recognizes and binds to the cells expressing the mMuSK-R and does not bind to the cells lacking expression of mMuSK-R; and
- d) separating the cells that bind to the monoclonal antibody from cells that do not bind to the antibody.

24. The method according to claim 23 wherein the antibody is selected from the group consisting of H1, H2, H4 and an antibody which binds specifically to an epitope in the extracellular domain as recognized by the antibody H1.